

**CLAIMS:**

1. An ion mobility spectrometer system comprising:  
an ion mobility detector;  
5 a gas/vapour circulating system for the ion mobility detector into which samples of gases and vapours of interest may be drawn for detection;  
the circulating system comprising an ion mobility cell, means for drying and/or cleaning the circulating gases/vapours in the circulating system, a dopant source, and means for causing circulation of the  
10 gases/vapours within the circulating system;  
in which the dopant source and the means for drying and/or cleaning the circulating gases/vapours are combined, whereby the need for a physically separate dopant source for the system is obviated.  
15
2. An ion mobility spectrometer in accordance with Claim 1 in which the dopant source material is physically combined with the material for drying and or cleaning the circulating gases/vapours.
- 20 3. An ion mobility spectrometer in accordance with Claim 2 in which the material for drying and/or cleaning the circulating gases/vapours is a molecular sieve material.
- 25 4. An ion mobility spectrometer in accordance with any one of the preceding claims in which at least one further dopant source is used in addition to the combined dopant source and means for drying and cleaning of the circulating gases/vapours.

5. An ion mobility spectrometer system in accordance with any one of the preceding claims in which the dopant material is ammonium carbamate, and the molecular sieve material is 13X pore size material.

5

6. An ion mobility spectrometer system in accordance with Claim 5 in which the dopant material and the molecular sieve material are combined in the proportions of between 0.1% to 0.5% by weight of dopant material to molecular sieve material.

10

7. An ion mobility spectrometer system in accordance with Claim 5 or Claim 6 in which the combined dopant and molecular sieve material is produced by heating the dopant material and the molecular sieve material together in a sealed vessel.

15

8. An ion mobility spectrometer in accordance with Claim 5 or Claim 6 in which the combined dopant and molecular sieve material is produced by passing a dry inert gas stream containing the dopant material at a fixed level over the molecular sieve material, whereby the molecular sieve material absorbs the dopant material.

20

9. An ion mobility spectrometer in accordance with Claim 1 in which the combined dopant and molecular sieve material is produced by agitating together the dopant material and the molecular sieve material.

25

10. An ion mobility spectrometer in accordance with Claim 1 in which the molecular sieve material has a pore size of 13X, 3A, 4A or 5A.

11. An ion mobility spectrometer in accordance with Claim 1 in which the dopant material is ammonia or ammonia in CO<sub>2</sub>.

5 12. An ion mobility spectrometer in accordance with Claim 1 in which the dopant material and the molecular sieve material are combined in the proportions of between 2 and 5% by weight of dopant material to molecular sieve material.

10 13. An ion mobility spectrometer in accordance with Claim 1 in which the dopant material and the molecular sieve material are combined in the proportions of between 0.1 and 10% by weight of dopant material to molecular sieve material.

15

20

25

10025005-131901